



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

151355



ACTION MEMORANDUM

DATE: **AUG 15 2001**

SUBJECT: Request for Restart and 12-Month Exemption for a Removal Action at the Cornell-Dubilier Electronics Site, South Plainfield, Middlesex County, New Jersey

FROM: Eric J. Wilson, On-Scene Coordinator
Removal Action Branch

TO: Richard L. Caspe, P.E.
Director
Emergency and Remedial Response Division

THRU:
Richard C. Salkie, Chief
Removal Action Branch

Site ID #: GZ

I. PURPOSE

The purpose of this Action Memorandum is to request a restart and 12-month exemption for the removal action described herein for the Cornell-Dubilier Electronics Site (Site), located in South Plainfield, Middlesex County, New Jersey, 07080.

The proposed action involves the removal and disposal of contaminated soil from the residential property located at 126 Spicer Avenue in South Plainfield and restoration of the property to pre-removal conditions. The estimated cost for this work is \$119,403 of which \$72,806 is for mitigation contracting. Costs associated with this action are not expected to exceed the costs previously authorized in the Action Memorandum for this Site dated September 23, 1998. As such, the overall project ceiling of \$425,000 remains unchanged.

Conditions at the Site continue to meet the criteria for a removal action under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as documented in

Section 300.415(b)(2) of the National Contingency Plan (NCP). The Site is on the National Priorities List (NPL). There are no nationally significant or precedent-setting issues associated with this removal action.

II. SITE CONDITIONS AND BACKGROUND

The Comprehensive Environmental Response, Compensation and Liability Information System ID Number for the Site is NJD981557879.

A. Site Description

1. Removal site evaluation

Cornell-Dubilier Electronics operated at the Hamilton Industrial Park from 1936 to 1962 manufacturing electronic parts and components, including capacitors. It is reported that Cornell-Dubilier tested transformer oils for an unknown period of time and that polychlorinated biphenyl (PCB) contaminated materials and other hazardous substances were deposited directly onto soils at the industrial park.

EPA conducted sampling at the industrial park in June 1994, October 1994 and February 1996 for a Site Inspection Prioritization documenting the release of hazardous substances to the environment. Elevated concentrations of volatile organic compounds, semi-volatile organic compounds, PCBs and inorganic constituents were found in soils at the industrial park. PCBs were also detected in surface waters and sediment of the Bound Brook downstream of the Site at concentrations above background.

A Removal Site Evaluation (RSE) was conducted by the U.S. Environmental Protection Agency (EPA) Removal Action Branch between March 1996 and January 1997. Contamination of site soils and surface waters and sediments of the Bound Brook was confirmed during the RSE. Based on the findings of the RSE, the Site was determined to be eligible for CERCLA removal action. The Site was referred to EPA for removal action consideration by the New Jersey Department of Environmental Protection (NJDEP) on April 2, 1997.

In response to community concerns about the potential for the migration of contaminants from the industrial park to the surrounding community, EPA collected soil and indoor dust samples from residential properties located near the industrial park between June 1997 and November 1998. PCBs were detected at concentration up to 22 ppm in soil and 205 ppm in indoor dust. A screening level risk assessment was conducted based on this data. Cancer and non-cancer risks from exposure to PCBs in soil and dust were calculated for each of the properties sampled. The cancer risks for residents of these properties range from 1×10^{-6} to 7.5×10^{-4} . The non-cancer risks for residents of these properties range from a Hazard Index (HI) of 0.23 to 170. Cancer and non-cancer risks associated with exposure to PCB at some of the residential properties sampled exceed Superfund acceptable risk levels specified in Section 300.420(e)(2) of the NCP. A removal action was determined to be necessary to mitigate these risks. Remediation goals for

this action were developed in consultation with the Remedial Program and included the removal of soil to reduce the average concentration of PCBs at each property to 1 ppm and cleaning of homes where actual or potential health concerns were identified by the Agency for Toxic Substances and Disease Registry (ATSDR). The original risk assessment for residential properties surrounding the site and the addendum which addresses the residential property located at 126 Spicer Avenue (referred to as Property FF) are included as Appendix A and Appendix B.

2. Physical location

The Comell- Dubilier Electronics Site is located in a mixed industrial, commercial and residential area of South Plainfield, New Jersey and consists of the Hamilton Industrial Park, adjacent contaminated residential and commercial properties and contaminated portions of the Bound Brook downstream of the industrial park.

The Hamilton Industrial Park occupies approximately 25 acres and is bordered by commercial property, residences, wetlands and the Bound Brook. Comell-Dubilier Electronics operated at the Site from 1936 to 1962. The current owner of the industrial park is DSC of Newark, Inc.

Residential homes are located on Spicer Avenue and on Hamilton Boulevard within 100 feet of the Site. It is estimated that 540 persons reside within 0.25 miles of the Site. The total population estimated to live within one mile of the Site is 8,700 persons.

The residential property proposed for removal action is located southwest of the industrial park at 126 Spicer Avenue in South Plainfield. This property is identified as Block 337 Lots 14, 14.01 and 15 on the Tax Map of South Plainfield, New Jersey. A site location map is included as Figure 1, in Appendix C.

3. Site characteristics

During its years of operation at the Site (1936 to 1962), Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors. In addition, it is reported that Cornell-Dubilier Electronics, Inc. tested transformer oils for an unknown period of time until they vacated the Site. It is alleged that during their operations, Cornell-Dubilier Electronics, Inc. dumped PCB-contaminated materials and other hazardous substances directly onto site soils.

The Hamilton Industrial Park is occupied by approximately 15 businesses. The owner of the property is DSC Enterprises of Newark, Inc. Through the years, dozens of companies have operated at the Site as tenants.

The proposed action is a restart. Previous removal actions at the Site are described in Section II B of this memorandum.

4. Release or threatened release into the environment of a hazardous substance, or pollutant, or contaminant

The results of EPA's sampling and analyses indicate elevated concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds, PCBs and inorganic constituents in the soils at the industrial park. Building interiors at the industrial park were found to contain elevated levels of PCBs and metals. Investigations conducted by EPA in the community surrounding the industrial park have revealed the presence of PCBs in soils and in house dust at several residences located near the industrial park. Fish collected from the Bound Brook were found to contain PCBs at concentrations higher than allowed by the Food and Drug Administration.

PCBs have migrated from the industrial park to adjacent residential properties. As part of removal investigation activities, EPA collected soil and indoor dust samples from residential properties located near the industrial park between June 1997 and November 1998. PCBs were detected at concentration up to 22 ppm in soil and 205 ppm in indoor dust.

In November 1998 EPA collected soil samples at 31 locations from the residential property at 126 Spicer Avenue. PCBs were detected in soil samples at concentrations ranging from 0.34 ppm to 6.2 ppm. Two indoor dust samples were also collected from this property. PCBs were detected in indoor dust samples collected at concentrations of 0.23 ppm and 0.66 ppm.

Polychlorinated biphenyls are hazardous substances as defined by Section 101(14) of CERCLA as amended by the Superfund Amendments and Reauthorization Act.

5. NPL status

The Site was added to the NPL on July 27, 1998.

6. Maps, pictures, and other graphics representations

Figures included in Appendix C provide the location of the Site and sampling locations at 126 Spicer Avenue.

B. Other Actions to Date

1. Previous actions

On March 25, 1997, a Unilateral Administrative Order (UAO) was issued to DSC of Newark (DSC) which required a removal action be taken to stabilize the Site. The scope of work specified in the order included the paving of facility driveways and parking areas, instituting access controls and installing drainage controls to limit off-site migration of contaminants through surface water run-off. The work plan for this action was approved by EPA on June 11, 1997. Implementation of the work plan was initiated July 7, 1997. Paving of driveways

and parking areas, installation of security fence and warning signs and installation of drainage controls were completed on January 16, 1998 at a cost of \$391,255. DSC has been notified of additional removal actions required to stabilize the Site. On October 8, 1999, EPA required DSC to characterize, remove and dispose of stockpiled waste which was accumulated on-site and to repair drainage controls. On May 3, 2000, DSC was required to characterize, remove and dispose of twelve drums and numerous 5-gallon pails of unknown materials discovered by EPA while clearing the Site in preparation for the remedial investigation. On December 4, 2000, DSC was required to make repairs to fences installed to restrict access to areas of known contamination. The additional removal actions listed above have been completed by DSC. A report documenting actions taken by DSC to comply with the UAO remains to be completed.

On August 7, 1997, EPA initiated a removal action to fabricate and post signs warning anglers not to eat fish taken from the Bound Brook and New Market Pond. PCBs were found in samples collected of edible fish taken from these waters. On the morning of August 8, 1997, EPA and the NJDEP met with elected officials from the affected communities to inform them of these sampling results and planned actions to address public health concerns. Later that day, in a joint press conference, EPA announced the results of the edible fish sampling and NJDEP announced the interim fish consumption advisory for the Bound Brook. Warning signs were installed at access points to the Bound Brook and New Market Pond on August 8 and 9, 1997. This removal action was completed August 9, 1997 at a cost of \$3,487.

2. Current actions

A removal action was determined to be necessary to address unacceptable risks associated with exposure to PCBs in soil and indoor dust at residential properties located near the industrial park. The work was divided as follows.

In August 1998, an Administrative Consent Order (ACO) was issued to Cornell-Dubilier Electronics and DSC of Newark for the removal and disposal of PCB contaminated soil from six residential properties. Plans for this work were approved by EPA on December 12, 1998. Implementation of the approved work plan was initiated March 15 1999. This work was completed on September 16, 1999 at a cost of \$477,054.

In March 1999, an Administrative Consent Order was issued to Cornell-Dubilier Electronics and Dana Corporation for removal and disposal of PCB contaminated soil from an additional seven residential properties. DSC of Newark and Federal Pacific Electric were ordered to participate and cooperate in this work in April 1999. Plans for this work were approved by EPA on August 26, 1999. Implementation of the approved work plan was initiated September 23, 1999. This work was completed September 29, 2000 at a cost of \$323,424.

On March 29, 1998, EPA initiated the cleaning of the interiors of homes where PCBs were found in dust at levels of potential public health concern. The cleaning was initiated on April 4, 1998 and completed April 26, 1998. Seven homes (Tier 1) were cleaned during the first phase of this work. Post-cleaning indoor dust samples were collected to determine the effectiveness of the

cleaning. Indoor dust samples were collected from an additional 29 homes (Tier 2) between April and October 1998. Based on the results of this sampling, additional actions were required at three Tier 1 homes cleaned in April 1998 and at eight Tier 2 homes. In February 1999, one of the Tier 1 homes and four of the Tier 2 homes were cleaned. Removal activities at the remaining six homes were completed in March 2000 after completion of PRP-lead soil removal at these properties. A total of 15 homes were cleaned during the course of this removal action. This removal action was completed March 21, 2000 at a cost of \$ 243,535.

In June 2000, an Administrative Consent Order (Index Number: CERCLA-02-2000-2005) was issued to DSC of Newark for removal and disposal of PCB contaminated soil from the residential property at 126 Spicer Avenue in South Plainfield, New Jersey. The work required by this order included: delineation of the extent of PCB contamination at this property; excavation, removal and disposal of PCB contaminated soil; and, restoration of the property to pre-removal conditions. Plans for this work were approved by EPA on November 1, 2000. DSC did not meet the schedule specified in the work plan or properly notify EPA of delay in performance in accordance with the terms of the order. On March 27, 2001, EPA met with representatives of DSC, discussed areas of non-compliance with the order and provided DSC with a schedule of the actions necessary to come into compliance with the order. On May 10, 2001, EPA notified DSC that plans submitted as a follow up to this meeting were deficient and set a schedule for correcting the deficiencies. Revised plans were not provided within the schedule established. DSC has repeatedly failed to perform the work specified in the order promptly and properly. As a results of this failure, a fund-lead takeover of the work is necessary to protect public health or welfare or the environment.

C. State and Local Authorities' Role

1. State and local actions to date

There have been no State or local remedial actions taken at the Site. The New Jersey Department of Health and Senior Services (NJDHSS) is providing health consultations to the EPA through the Agency for Toxic Substances and Disease Registry (ATSDR). Based on the results of EPA's sampling, the NJDEP issued a fish consumption advisory for the Bound Brook and its tributaries including Newmarket Pond and Spring Lake.

2. Potential for continued State/local response

It is anticipated that the NJDHSS will continue to provide technical assistance to the EPA concerning health issues at the Site. At this time, it is not known whether there will be any other future State or local actions taken at the Site.

III THREATS TO PUBLIC HEALTH, OR WELFARE, OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

The following factors described in 40 CFR Part 300.415(b)(2) of the NCP were applied in determining the appropriateness of a removal action at the Site.

- (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants, or contaminants; and
- (ii) The availability of other appropriate federal or State response mechanisms to respond to the release.

A. Threats to Public Health or Welfare

In November 1998 EPA collected soil samples from 31 locations at the residential property at 126 Spicer Avenue. PCBs were detected in soil samples at concentrations ranging from 0.34 ppm to 6.2 ppm. Two indoor dust samples were also collected from this property. PCBs were detected in indoor dust samples collected at concentrations of 0.23 ppm and 0.66 ppm. EPA risk assessors evaluated this data and concluded that an unacceptable risk exists for residents of this property from exposure to PCBs, and that the property exceeds the overall project remediation goal of 1 ppm PCBs in soil. The cancer risk for this property was determined to be 7.8×10^{-6} . The non-cancer hazard index for this property was determined to be 1.8. The risk assessment which addresses this property is included as Appendix C.

Exposure to hazardous substances detected at this property by direct contact, inhalation, or ingestion may, if not controlled, cause a variety of adverse human health effects. Under certain circumstances, PCBs are readily absorbed into the body. They may persist in tissues for years after exposure stops. Chemical acne, dark patches on skin, burning eyes and skin, and unusual eye discharge have been reported by all routes of exposure. Generally, onset may not occur for months. These effects may last for months. Liver damage and digestive disturbance have been reported. PCBs may impair the function of the immune system and at high levels have been shown to produce cancer and birth defects in laboratory animals. PCBs have the ability to bioaccumulate to concentrations that are toxic. A number of human studies indicate that PCBs can cross the placenta and locate in the fetus. PCBs also have the ability to concentrate in human breast milk.

B. Threats to the Environment

EPA's investigation of ecological impacts of contamination of the Bound Brook documented many contaminants at relatively high levels adjacent to and/or immediately down gradient of the Site, indicating that the Site is the primary source of many of the contaminants of concern within the section of the Bound Brook corridor investigated. An ecological risk assessment conducted,

based on the results of this investigation, found that the structure and function of the Bound Brook and its stream corridor, adjacent to and downstream of the Site, is at risk from chemical contamination. Benthic organisms, fish, birds, omnivorous mammals and camivorous mammals utilizing the stream and stream corridor were determined to be at risk.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

A. Consistency Exemption

- 1.** Continued response actions are otherwise appropriate and consistent with the remedial action to be taken.

Section 104(c) of CERCLA, as amended, limits removal actions to twelve months unless an exemption is justified by an emergency or a determination of consistency with the remedial action. Exposure to PCBs in soil at 126 Spicer Avenue, poses an unacceptable health risk for residents of this property. The removal of PCB-contaminated soil from this property is an appropriate response action, is necessary to protect the health and welfare of residents and is fully consistent with the proposed remedial action. Future remedial actions would need to address health risks associated with PCB contaminated soil.

VI. PROPOSED ACTIONS AND ESTIMATED COST

A. Proposed Actions

- 1.** Proposed action description

The proposed removal action involves taking over the soil removal at 126 Spicer Avenue which was started by DSC under an ACO (Index Number: CERCLA-02-2000-2005). DSC completed a work plan and conducted some sampling to delineate the extent of PCB-contamination in soil at 126 Spicer. EPA conducted additional sampling at 126 Spicer Avenue on June 14, 2001 to complete the delineation of PCB contamination at this property. The following work required in the order remains to be completed:

- a. Excavation, removal and off-site disposal of PCB contaminated soil from this property. The extent of soil removal at this property shall be determined such that the 95% upper confidence limit (UCL) of the arithmetic mean PCB concentration in soils in the portion of the property not excavated shall not exceed 1.0 mg/kg.

- b. Restoration of properties disturbed as a result of these actions to pre-construction conditions.
- c. Temporary relocation of residents during soil removal and restoration activities as necessary to perform the work.
- d. Coordination of activities with residents and the community.

2. Contribution to remedial performance

Removal action at the Site is consistent with the requirement of Section 104(a)(2) of CERCLA, which states, "any removal action undertaken...should...to the extent practicable, contribute to the efficient performance of any long-term remedial action with respect to the release or the threatened release concerned." These actions will mitigate threats posed to human health which would otherwise have to be addressed through remedial action.

3. Description of alternative technologies

No alternative technologies were considered for this removal action.

4. EE/CA

Due to the time critical nature of this removal action, an EE/CA was not prepared.

5. Applicable or Relevant and Appropriate Requirements (ARARS)

ARARS that are within the scope of these actions will be met to the extent practicable. Federal ARARS determined to be applicable include the Occupational Safety and Health Act, the Resource Conservation and Recovery Act and the Toxic Substances Control Act.

6. Project schedule

The removal action will be initiated upon approval of this memorandum. Field work is expected to take approximately one month to complete.

B. Estimated Costs

The proposed action involves the removal and disposal of contaminated soil from the residential property located at 126 Spicer Avenue in South Plainfield and restoration of the property to pre-removal conditions. The estimated costs for this project are summarized below. As noted above, sufficient funds were previously authorized to cover the work proposed in this Action Memorandum.

<u>Extramural Costs:</u>	<u>Current Ceiling</u>	<u>Cost to Date</u>	<u>Proposed Costs</u>	<u>Proposed Ceiling</u>
<u>Regional Allowance Costs:</u>				
ERRS Cleanup contractor:	\$332,000	\$247,022	\$ 72,806	\$319,828
<u>Other Extramural Costs:</u>				
RST/START	<u>22,000</u>	<u>10,481</u>	<u>10,000</u>	<u>20,481</u>
Subtotal Extramural Costs	354,000	257,503	82,806	340,309
Extramural Cost Contingency	<u>21,000</u>	<u>NA</u>	<u>16,997</u>	<u>16,997</u>
Total Extramural Costs	\$375,000	\$257,503	\$ 99,803	\$357,036
<u>Intramural Costs:</u>				
Intramural Direct Costs	10,000	16,195	6,600	22,795
Intramural Indirect Costs	<u>20,000</u>	<u>31,899</u>	<u>13,000</u>	<u>44,899</u>
Total Intramural Costs	<u>50,000</u>	<u>48,094</u>	<u>19,600</u>	<u>67,694</u>
Total Project Ceiling	\$425,000	\$305,597	\$119,403	\$425,000

VII EXPECTED CHANGE IN THE SITUATION SHOULD NO ACTION BE TAKEN OR ACTION DELAYED

If no action is taken or action substantially delayed, residents would be at risk of experiencing adverse health effects from exposure to PCBs.

VIII OUTSTANDING POLICY ISSUES

No known outstanding policy issues are associated with this removal action.

IX. ENFORCEMENT

Notice Letters were issued to two PRPs on February 4, 1997 and to two additional PRPs on July 22, 1998.

X. RECOMMENDATION

This decision document represents the selected removal action for the Cornell-Dubilier Electronics Site located in South Plainfield, Middlesex County, New Jersey developed in accordance with CERCLA, as amended, and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal action and the CERCLA Section 104(c) consistency exemption from the 12-month limitation. The estimated costs for this project are \$119,403; of this \$72,806 will be funded from the Regional removal allowance. The previously approved project ceiling includes sufficient monies to fund this action. The overall project ceiling for this Site remains at \$425,000, of this \$319,828 is for mitigation contracting. There are sufficient monies in our current Advice of Allowance to fund this project.

Please approve the restart and 12-month exemption for the Removal Action at the Cornell-Dubilier Electronics Site as per current Delegation of Authority, by signing below.

APPROVAL: _____

DATE: 8/23/01

Richard L. Caspe, P.E.

Director

Emergency and Remedial Response Division

DISAPPROVAL: _____

DATE: _____

Richard L. Caspe, P.E.

Director

Emergency and Remedial Response Division

cc: (after approval is obtained)

W. Muszynski, ARA

R. Caspe, ERRD-D

W. McCabe, ERRD-DD

R. Salkie, ERRD-RAB

J. Rotola, ERRD-RAB

G. Zachos, ACSM/O

R. Dease, ERRD-RPB

C. Peterson, ERRD-NJRB

D. Karlen, ORC-NJSUP

B. Bellow, CD

M. Cervantes, 5202G CD/POB

J. Smolenski, NJDEP

G. Wheaton, NOAA

A. Raddant, DOI

C. Kelley, RST

APPENDIX A

RISK ASSESSMENT - JUNE 1998

Human Health Risk Assessment
Residential Soils Surrounding the Comell-Dublier Site
South Plainfield, New Jersey

June 2, 1998

Prepared by:
Program Support Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
290 Broadway
New York, New York 10007

Risk Assessment for Soils and Dust From Areas Surrounding the Comell-Dublier Site

I. Introduction

The goal of this screening level risk assessment is to assess the potential risks and hazards associated with ingestion of interior dust and exterior soils in South Plainfield, New Jersey. Soil samples from 16 residences and interior samples from 12 interiors were collected from homes surrounding the Comell Dublier site. The assessment was conducted using standard risk assessment procedures (U.S. EPA, 1989; U.S. EPA, 1991; and U.S. EPA, 1998). The analysis is organized according to the risk assessment paradigm (NRC, 1983).

II. Data Evaluation

The interior dust samples were collected on November 17 and 18, 1997 by EPA's contractor to determine the potential extent of contamination of polychlorinated biphenyls (PCBs) in residences located southwest of the Hamilton Industrial Park in South Plainfield, New Jersey. A total of 12 residences were sampled since 4 residences did not agree to interior sampling. The sampling was conducted by the Response Engineering Analytical Contract and reported in the February 1998 document "Final Report Vacuum Dust Sampling Comell-Dublier Electronics, South Plainfield, New Jersey". Samples were collected using High Efficiency Particulate Air (HEPA) vacuums. Originally, the sample areas were planned to be 1 meter squared but due to the low sample mass the sampling area was increased.

Soil samples were collected from 16 residences. All samples are grabs, collected 0-2" below ground surface over an area of approximately 6" x 6" from October 27, 1997 to October 30, 1997. EPA's Removal Assessment personnel indicated that many yards had lawns and grass cover that may aid in reducing potential exposures.

The exterior and interior soil samples were QA/QCed following EPA Region II's methods. Thirty-seven dust samples were collected for PCB analysis. Twenty-nine samples showed levels of weathered Aroclor 1254 above the method detection limit. The weathering designations indicate that the Aroclor in question is present, but due to breakdown, most predominant peaks are present with some changed peak ratios. Sample levels ranged from 120 ug/kg to 120,000 ug/kg. Ten samples had levels of weathered Aroclor 1260 above the Method Detection Limit (MDL) ranging from 54 ug/kg to 85,000 ug/kg. Aroclors 1016, 1221, 1232, 1242 and 1248 were not found above the MDL. No Aroclors were reported detected in the System Blank.

Since Aroclors 1016, 1221, 1232, 1242, and 1248 were not detected in any samples they were not evaluated in the assessment as described in the Risk Assessment Guidance for Superfund - Part A (U.S. EPA, 1989). The concentrations for the individual Aroclors 1254 and 1260 were added together based on discussions with the On Scene Coordinator and the OSC's discussion with the chemist. The risks presented are for Total PCBs based on the addition of the concentrations for Aroclor 1254 and Aroclor 1260.

III. Exposure Assessment

The potential exposure to the dust and soil were evaluated as described in RAGS-Part A (U.S. EPA, 1989). Exposures were evaluated using EPA's default exposure assumptions (U.S. EPA, 1991).

Essentially, exposures were assumed for a 70 kg (154 lbs) adult for 24 years based on 350 days/year and for a 15 kg (33 lbs) child for 350 days/year for 6 years. The total risks and hazards were based on combining risks and hazards from the child and adult. Children were assumed to ingest 200 mg of soil and dust/day while adults were assumed to ingest 100 mg of soil and dust/day.

The assumptions are for the Reasonably Maximally Exposed Individual (child and adult) receiving their entire soil exposure per day from this source. It is also assumed that the individual will be exposed only to PCBs. This may potentially over-estimate risks since there is a potential for people to be exposed to other sources when they are away from the home. This assumption also assumes a constant source of exposure from the yard for the next 30 years which may also potentially over-estimate risks since remediation would reduce these risks and hazards.

To apportion the interior and exterior exposures the recommendations from the IEUBK model for lead were used (U.S. EPA, 1995). The IEUBK methodology recommends using an assumption of 55% exposure from the interior source and 45% as the exterior source.

Other potential routes of exposure include inhalation of dust particulates and dermal contact with the dust. Based on the short turn around time to develop this screening level assessment, modeling of dust particulate and dermal contact were not attempted. However, since > 10% of PCBs may be absorbed through dermal exposure the Soil Screening Level guidance recommendation of assuming 50% from ingestion and 50% from dermal and inhalation was applied. This may potentially over-estimate the risks based on the small sample mass for the interior dust and the extrapolation of the interior and exterior data over a period of 30 years. As a check on the assumptions, the Preliminary Remediation Goal of 1 ppm that includes both ingestion and dermal contact equates to a Hazard Index of 1 and a cancer risk of approximately 5×10^{-6} . These values are similar to the values calculated using the doubling approach as shown in the attached Tables.

IV. Toxicity Assessment

A cancer slope factor of 2 mg/kg-day was used based on the recommendations of the "PCBs: Cancer-Dose Response Assessment and Application to Environmental Mixtures" (U.S. EPA, 1996 and U.S. EPA, 1998). For the non-cancer analysis the Reference Dose for Aroclor 1254 was used in the analysis based on the similarities of Aroclors 1254 and 1260 to Aroclor 1254. Based on studies in animals, PCBs are classified as a probable human carcinogen and non-cancer health effects associated Aroclor 1254 exposure include reduced birth weight and effects on the immune system.

V. Risk Calculations

The following sections provide a summary of the concentrations of Aroclor 1254 and Aroclor 1260 found in the interior and exterior of each residence. The concentrations for the exterior are based on a 95% Upper Confidence Limit of the total PCBs where adequate numbers of samples were available and the 95% UCL did not exceed the maximum concentration (U.S. EPA, 1992). Where the 95% UCL exceeded the maximum concentration the maximum concentration was used in the calculation (U.S. EPA, 1992).

The number of interior samples varied from 3 to 8 based on Aroclor specific values with only 3 or 4 samples based on the Total PCBs. This total number of samples did not provide an adequate number of values to calculate a 95% Upper Confidence Limit (U.S. EPA, 1991). The maximum values were used in the calculation of risk and hazard.

The following sections summarize the range of values found in the interior and exterior for each property. A calculated cancer and non-cancer risk is also provided for each property.

Property A.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.12			0.41
	1260	0.013 (U)			0.25 (U)
	Combined	0.17	0.37		0.50
Exterior	1254	0.030 (U)			2.4
	1260	0.030 (U)			0.860
	Combined	0.060 (U)	0.78	1.4	3.3

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	2.6E-07	6.0 E-07	0.02	0.18
Dermal/Inhalation	2.6E-07	6.0 E-07	0.02	0.18
Exterior				
Ingestion	6.0E-07	1.4 E-06	0.04	0.40
Dermal/Inhalation	6.0E-07	1.4 E-06	0.04	0.40
Total	1.7E-06	4.0 E-06	0.12	1.16
Total Cancer Child & Adult	5.7E-6		1.3	

Property B.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.42			5.2
	1260	0.055 (U)			0.12 (U)
	Combined	0.50			5.3
Exterior	1254	0.062			8.7
	1260	0.030 (U)			1.8
	Combined	0.092	2.7	6.4	11

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	2.7E-06	6.3E-06	0.20	1.85
Dermal/Inhalation	2.7E-06	6.3E-06	0.20	1.85
Exterior				
Ingestion	2.7E-06	6.3E-06	0.20	1.84
Dermal/Inhalation	2.7E-06	6.3E-06	0.20	1.84
Total	5.4E-06	1.26E-05	0.80	7.38
Total Cancer Child & Adult	1.8E-05		8.2	

Property C.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	15			38
	1260	4.0			9.2
	Combined	24	38		47
Exterior	1254	0.030 (U)			21
	1260	0.030 (U)			1.2
	Combined	0.060 (U)	2.7	6.5	21

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	2.4 E-05	5.7E-05	1.77	16.60
Dermal/Inhalation	2.4 E-05	5.7E-05	1.77	16.60
Exterior				
Ingestion	2.8 E-06	6.5E-05	0.20	1.88
Dermal/Inhalation	2.8 E-06	6.5E-05	0.20	1.88
Total	5.4E-05	1.3E-04	3.94	36.96
Total Cancer Child & Adult	1.8E-04		41	

Property D.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	2.5			30
	1260	0.015 (U)			3.5
	Combined	2.5	17		30
Exterior	1254	0.090			2.8
	1260	0.11			2.2
	Combined	0.23	1.0	1.6	3.4

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	1.6E-05	3.6E-05	1.13	10.57
Dermal/Inhalation	1.6E-05	3.6E-05	1.13	10.57
Exterior				
Ingestion	6.9E-07	1.6E-06	0.05	0.47
Dermal/Inhalation	6.9E-07	1.6E-06	0.05	0.47
Total	3.2E-05	3.8E-05	2.4	22.08
Total Cancer Child & Adult	7.0E-05		24	

Property E.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	17			120
	1260	8.1			85
	Combined	25	79		200
Exterior	1254	2.4			22
	1260	0.30(U)			1.6 (U)
	Combined	2.7	11	15	24

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	1.1E-04	2.5E-04	7.72	72.1
Dermal/Inhalation	1.1E-04	2.5E-04	7.72	72.1
Exterior				
Ingestion	6.2E-06	1.4E-05	0.45	4.2
Dermal/Inhalation	6.2E-06	1.4E-05	0.45	4.2
Total	2.24E-04	5.2E-04	16.34	152.5
Total Cancer Child & Adult	7.5E-04		170	

Property F.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.15			0.55 (U)
	1260	0.033 (U)			0.55 (U)
	Combined	0.18 (U)	0.58		1.1 (U)
Exterior	1254	0.30 (U)			5.6
	1260	0.030 (U)			1.3
	Combined	0.60 (U)	1.6	2.1	6.9

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	5.7E-07	1.3E-06	0.04	0.39
Dermal/Inhalation	5.7E-07	1.3E-06	0.04	0.39
Exterior				
Ingestion	8.7E-07	2.0E-06	0.06	0.60
Dermal/Inhalation	8.7E-07	2.0E-06	0.06	0.60
Total	2.8E-06	9.6E-06	0.20	2.00
Total Cancer Child & Adult	1.3E-05		2.2	

Property G.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	1.3			7.9
	1260	0.65 (U)			1.05 (U)
	Combined	2.4	3.6		8.6
Exterior	1254	0.17			1.6
	1260	0.03 (U)			0.48
	Combined	0.2	1.1	1.3	2.1

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	4.4E-06	1.03-05	0.32	3.01
Dermal/Inhalation	4.4E-06	1.03-05	0.32	3.01
Exterior				
Ingestion	5.6E-07	1.31-06	0.04	0.40
Dermal/Inhalation	5.6E-07	1.31-06	0.04	0.40
Total	1.0E-05	2.4E-05	0.72	6.80
Total Cancer Child & Adult	3.2 E-05		7.5	

Property H.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	Not Sampled			
	1260	Not Sampled			
	Combined				
Exterior	1254	0.089			1.0
	1260	0.094			0.55
	Combined	0.18	0.58	0.77	1.29

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior Ingestion Dermal/Inhalation	Not Sampled		Not Sampled	
Exterior Ingestion Dermal/Inhalation	7.3E-07 7.3E-07	1.71E-06 1.71E-06	0.05 0.05	0.25 0.25
Total	1.46E-06	3.4E-06	0.10	0.50
Total Cancer Child & Adult	4.8E-06		0.60	

Property I.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.52			0.96
	1260	0.014 (U)			0.036 (U)
	Combined	0.53			1.0
Exterior	1254	0.025 (U)			15
	1260	0.025 (U)			2.5 (U)
	Combined	0.050 (U)	1.7	6.3	18

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	5.2E-07	1.20E-06	0.04	0.35
Dermal/Inhalation	5.2E-07	1.20E-06	0.04	0.35
Exterior				
Ingestion	2.7E-06	6.2E-06	0.19	1.81
Dermal/Inhalation	2.7E-06	6.2E-06	0.19	1.81
Total	6.4E-06	1.5E-05	0.46	4.32
Total Cancer Child & Adult	2.1E-05		4.8	

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.38			1.1
	1260	0.012 (U)			0.040 (U)
	Combined	0.38	0.62		1.1
Exterior	1254	0.030 (U)			3.6
	1260	0.030 (U)			0.93
	Combined	0.060 (U)	0.77	1.7	4.5

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	5.8E-07	1.3E-06	0.04	0.39
Dermal/Inhalation	5.8E-07	1.3E-06	0.04	0.39
Exterior				
Ingestion	4.9E-07	1.15E-06	0.04	0.34
Dermal/Inhalation	4.9E-07	1.15E-06	0.04	0.34
Total	2.14E-06	7.2E-06	0.16	1.5
Total Cancer Child & Adult	5.8E-06		1.7	

Property K.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	Not Sampled			
	1260				
	Combined				
Exterior	1254	0.050 (U)			1.4
	1260	0.030 (U)			0.44
	Combined	0.10	0.64	0.95	1.7

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior Ingestion Dermal/Inhalation				
Exterior Ingestion Dermal/Inhalation	8.9E-07 8.9E-07	2.1E-06 2.1E-06	0.065 0.065	0.61 0.61
Total	1.8E-6	4.2E-06	0.13	1.22
Total Cancer Child & Adult	6.0E-06		1.4	

Property L

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.080 (U)			0.33
	1260	0.042 (U)			0.15 (U)
	Combined	0.16 (U)	0.17		0.37
Exterior	1254	0.19			1.0
	1260	0.090			0.33
	Combined	0.28	0.80	1.02	1.3

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	2.0E-07	4.5E-07	0.01	0.13
Dermal/Inhalation	2.0E-07	4.5E-07	0.01	0.13
Exterior				
Ingestion	4.5E-07	1.0E-06	0.03	0.3
Dermal/Inhalation	4.5E-07	1.0E-06	0.03	0.3
Total	1.3E-06	3.0E-06	0.05	0.86
Total Cancer Child & Adult	4.2E-06		0.90	

Property M.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.13 (U)			0.25 (U)
	1260	0.13 (U)			0.25 (U)
	Combined	0.26 (U)	0.27		0.50 (U)
Exterior	1254	0.10			4.0
	1260	0.080			0.64
	Combined	0.18	1.1	1.4	4.3

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	2.6E-07	6.0E-07	0.019	0.18
Dermal/Inhalation	2.6E-07	6.0E-07	0.019	0.18
Exterior				
Ingestion	6.1E-07	1.4E-06	0.044	0.41
Dermal/Inhalation	6.1E-07	1.4E-06	0.044	0.41
Total	1.7E-06	4.0E-06	0.13	1.2
Total Cancer Child & Aduh	5.7E-06		1.3	

Property N.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	Not Sampled			
	1260				
	Combined				
Exterior	1254	0.30 (U)			6.8
	1260	0.030 (U)			1.9
	Combined	0.60	1.9	2.5	7.1

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior Ingestion Dermal/Inhalation	Not Sampled			
Exterior Ingestion Dermal/Inhalation	2.4E-06 2.4E-06	5.5E-06 5.5E-06	0.17 0.17	1.61 1.61
Total	4.8E-06	1.1E-05	0.34	3.22
Total Cancer Child & Adult	1.58-05		3.6	

Property O.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.49			2.5
	1260	0.095 (U)			0.54 (U)
	Combined	0.69	1.3		2.6
Exterior	1254	0.080			0.87
	1260	0.030 (U)			0.48
	Combined	0.15	0.38	0.54	1.3

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	1.3E-06	3.0E-06	0.09	0.88
Dermal/Inhalation	1.3E-06	3.0E-06	0.09	0.88
Exterior				
Ingestion	2.2E-07	5.1E-07	0.02	0.15
Dermal/Inhalation	2.2E-07	5.1E-07	0.02	0.15
Total	3.0E-06	7.0E-06	0.22	2.06
Total Cancer Child & Adult	1.0E-05		2.3	

Property P.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	Not Sampled			
	1260				
	Combined				
Exterior	1254	0.13			1.2
	1260	0.080			0.34
	Combined	0.24	0.69	0.85	1.5

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior Ingestion Dermal/Inhalation	Not Sampled			
Exterior Ingestion Dermal/Inhalation	7.9E-07 7.9E-07	1.8E-06 1.8E-06	0.06 0.06	0.54 0.54
Total	1.6E-06	3.6E-06	0.12	1.08
Total Cancer Child & Adult	5.2E-06		1.2	

VI. Risk Characterization and Uncertainties

The cancer risks were exceeded $1.0\text{E-}04$ for properties C ($1.8\text{E-}04$) and E ($7.5\text{E-}04$). The non-cancer Hazard Index was exceeded for Properties, B (8.2), C (41), D (24), E (170), F (2.2), G (7.5), I (4.8), J (1.7), N (3.6), and O (2.3).

The non-cancer hazards at Properties A (1.3), K (1.4), M (1.3), and P (1.2) slightly exceed the Hazard Index of 1 but is not significantly different from an HI of 1.

In evaluating the data it is important to note the following limitations of the data and risk assessment.

- The risk assessment is a screening level assessment based on limited dataset. For example, change in concentrations over various seasons could not be evaluated.
- The data is limited to a single sampling event for each area and there is a potential for variability of the concentrations over time. The concentrations used for the interior areas were maximum concentrations for total PCBs including Aroclor 1254 and Aroclor 1260. For the exterior areas the concentrations used were the 95% Upper Confidence Limits. In those cases where the maximum concentration was exceeded in the calculation of the 95% Upper Confidence Limit the maximum concentration was used. Depending on the source these concentrations may vary over the assumed exposure duration of 30 years and the calculated risks and hazards may potentially be overestimated.
- The number of interior samples is limited and may result in a potential overestimate of risk since the default values in the absence of an adequate number of samples is the maximum concentration.
- The sampling report indicates a low sample mass which may potentially overestimate the risks associated with the interior areas since these may be more concentrated samples and not representative.
- The assessment includes a number of assumptions concerning the transfer of soil from the exterior to the interior of the homes. These assumptions are based on best professional judgement and may either over or underestimate the risks.

References

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APPENDIX B

ADDENDUM TO RISK ASSESSMENT

Risk Assessment for Soils and Dust
From Areas Surrounding the Cornell-Dublier Site

I. Introduction

The goal of this screening level risk assessment is to:

- Assess the potential risks and hazards associated with ingestion of exterior soil from property FF in South Plainfield, New Jersey collected on November, 1998.
- Evaluate vacuum dust samples for several residences in the area of the site (237 Delmore, 135 Delmore, 126 Spicer, 401 Hamilton and 403A Hamilton) collected in October 1998.
- Evaluate wipe samples from commercial properties in the commercial area.

The assessment was conducted using standard risk assessment procedures (U.S. EPA, 1989; U.S. EPA, 1991; and U.S. EPA, 1998). The analysis is organized according to the risk assessment paradigm (NRC, 1983).

II. Data Evaluation

The interior vacuum samples, interior wipe samples, and soil samples from commercial properties were collected on October 26 and 27, 1998. This sampling was conducted for EPA through the Response Engineering Analytical Contract and reported in the December 29, 1998 report "Final Report Vacuum, Wipe and Soil Sampling Cornell Dublier Electronics South Plainfield, New Jersey, December 1998". Vacuum samples were collected using High Efficiency Particulate Air (HEPA) vacuums. Originally, the sample areas were planned to be 1 meter squared but due to the low sample mass the sampling areas were increased.

On November 14, 1998, exterior soil samples were collected from one residential property identified as properties FF in your memo dated January 22, 1999. This sampling was conducted for EPA through the Superfund Technical Assessment and Response Team Contract and is reported in the January 18, 1999 document "Cornell Dublier Site, South Plainfield, New Jersey Data Validation Assessment". These Soil samples were collected 0-2" below ground surface over an area of approximately 6" x 6". EPA's Removal Program personnel indicated that this yard had grass cover over the unimproved portions of the property that may aid in reducing potential exposures.

The exterior soil samples were QA/QCed following EPA Region IP's methods. Sample levels ranged from 0.120 mg/kg to 6.0 mg/kg. Aroclors 1016, 1221, 1232, 1242 and 1248 were not found above the MDL. No Aroclors were reported detected in the System Blank.

Since Aroclors 1016, 1221, 1232, 1242, 1248 and to a limited extent Aroclor 1260 were not detected in any samples they were not evaluated in the assessment as described in the Risk Assessment Guidance for Superfund - Part A (U.S. EPA, 1989). The concentrations for the

individual Aroclors 1254 and 1260 were added together, where appropriate, based on discussions with the On Scene Coordinator and the OSC's discussion with the chemist. The risks presented are for Total PCBs based on the addition of the concentrations for Aroclor 1254 and Aroclor 1260 where appropriate.

The interior dust samples were Quality Assured/Quality Controlled (QA/QCed) following the EPA Environmental Response Team's methods. Sample levels ranged from non-detect to 39.0 mg/kg. Several samples were identified as Weathered (W) for Aroclors 1254 and 1260 above the method detection limit. The weathering designations indicated that the Aroclor is present, but due to breakdown in the environment, most predominant peaks are present with some changed peak ratios.

Several interior samples had high detection limits based on the small recovery of dust within the sampling area. Where detection limits were high and non-detects were identified no attempt was made to quantify the risks based on the small amount of dust available for exposure and the reduced possibility of an individual being exposed at the calculated ingestion rates for a period of 350 days and 30 years. Determination was made based on the Method Detection Level found at the background home and professional judgement concerning the amount of recovery and the area evaluated.

III. Exposure Assessment

The potential exposure to the dust and soil were evaluated as described in RAGS-Part A (U.S. EPA, 1989). Exposures were evaluated using EPA's default exposure assumptions (U.S. EPA, 1991).

Essentially, exposures were assumed for a 70 kg (154 lbs) adult for 24 years based on exposure for 350 days/year and for a 15 kg (33 lbs) child exposed for 350 days/year for 6 years. The total risks and hazards were based on combining risks and hazards from the child and adult. Children were assumed to ingest 200 mg of soil and dust per day while adults were assumed to ingest 100 mg of soil and dust/day (U. S. EPA, 1991). Where soil data is not available the total exposure was assumed to occur from the interior.

The assumptions are for the Reasonably Maximally Exposed Individual (child and adult) receiving their entire soil exposure per day from this source. It is also assumed that the individual will be exposed only to PCBs. This may potentially over-estimate risks since there is a possibility for people to be exposed to other sources when they are away from the home. This calculation also assumes a constant source of exposure from the yard or interior for the next 30 years which may also potentially over-estimate risks since remediation would reduce these risks and hazards.

To apportion the interior and exterior exposures the recommendations from the EPA guidance on residential sampling for lead including the protocols for dust and soil sampling were used (U.S. EPA, 1995). This guidance recommends using an assumption of 55% exposure from the interior source and 45% as the exterior source.

Other potential routes of exposure include inhalation of dust particulates and dermal contact with the dust. Based on the short turn around time to develop this screening level assessment, modeling of dust particulate and dermal contact were not attempted. However, since > 10% of PCBs may be absorbed through dermal exposure the Soil Screening Level (SSL) guidance was followed. The SSL guidance recommends assuming 50% of the exposure from ingestion and 50% from dermal and inhalation and this methodology was applied in this assessment. This may potentially over-estimate the risks based on the small sample mass obtained from the interior dust sampling and the extrapolation of the interior and exterior data over a period of 30 years.

As a confirmation on the assumption concerning the relative contribution of dermal and oral ingestion, the Preliminary Remediation Goal (PRG) calculation of 1 ppm was compared to the results from calculations for this site. The PRG calculation includes information on both ingestion and dermal contact. These exposure pathways for PCBs equate to a Hazard Index of 1 for non-cancer exposure based on the Aroclor 1254 Reference Dose and a cancer risk of approximately 5×10^{-6} (5 in one million). These values are similar to the values calculated using the doubling approach as shown in the attached Tables.

IV. Toxicity Assessment

A cancer slope factor of $2 \text{ (mg/kg-day)}^{-1}$ was used based on the recommendations of the "PCBs: Cancer-Dose Response Assessment and Application to Environmental Mixtures" (U.S. EPA, 1996 and 1998). For the non-cancer analysis the Reference Dose for Aroclor 1254 was used in the analysis based on the similarities between Aroclors 1254 and 1260 to Aroclor 1254. Based on studies in animals, PCBs are classified as a probable human carcinogen and non-cancer health effects associated Aroclor 1254 exposure include effects on the immune system based on studies in rhesus monkeys (U. S. EPA, 1998).

V. Risk Calculations

The following sections summarize the concentrations of Aroclor 1254 and Aroclor 1260 found in the interior dust and exterior soil of each residence. The concentrations for the exterior are based on a 95% Upper Confidence Limit (UCL) on the mean of the total PCBs where adequate numbers of samples were available and where a 95% UCL on the mean did not exceed the maximum concentration (U.S. EPA, 1992). Where the 95% UCL on the mean exceeded the maximum concentration, the maximum concentration was used in the calculation (U.S. EPA, 1992).

The number of interior samples varied from 1 to 2 based on Aroclor specific values with only 1 to 4 samples based on the Total PCBs. This total number of samples did not provide an adequate number of values to calculate a 95% UCL on the mean (U.S. EPA, 1991) and the maximum values were used to calculate the risk and hazard.

For the homes where post-cleaning sampling was performed and soil removal is planned the entire exposure was assumed to be from the interior because post-remediation soil data is not

available. This assumption may potentially overestimate risks based on the amount of sample collected over specific areas. As described earlier, where high detection limits were identified a qualitative discussion of the limitations of the sampling method were described and no attempt was made to quantify these risks using one-half of the detection limit.

The following sections summarize the range of values found in the interior and exterior for each property. A calculated cancer and non-cancer risk is also provided for each property.

The interior samples collected from commercial properties were wipe samples. The wipe samples were all non-detects at MDLs ranging from 1.3 pg/100 cm² (Aroclor 1016) to 2.5 µg/100 cm². Based on the lack of a quantified concentration in the swipe samples, a quantitative risk assessment was not conducted following procedures outlined in RAGS-Part A.

Evaluation of the soil data collected from the commercial properties indicates that the concentrations in soil are below the industrial risk level of 10 mg/kg for non-cancer. One location had a concentration of 7.1 mg/kg which is equivalent of a risk of 7.1×10^{-6} which is within the risk range.

Property FF (126 Spicer Avenue).

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.23			0.66
	1260				
	Combined	0.23			0.66
Exterior	1254	0.34	1.2	1.5	6.0
	1260	Non-Detect	0.2	0.2	0.4
	Combined	0.46	1.4	1.7	6.2

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	8.9 E-07	2.1 E-06	0.07	0.61
Dermal/Inhalation	8.9 E-07	2.1 E-06	0.07	0.61
Exterior				
Ingestion	2.8 E-07	6.5 E-07	0.02	0.19
Dermal/Inhalation	2.8 E-07	6.5 E-07	0.02	0.19
Total	2.3 E-06	5.5 E-06	0.17	1.6
Total Risk Child & Aduh	7.8 E-06		1.8	

* The 95% UCL was calculated for datasets with 10 or more samples as described in U.S. EPA's Supplemental Guidance to RAGS: Calculating the Concentration Term, Publication 9285.7-081, May 1992.

Property VI(237 Delmore).

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	1.9			1.9
Exterior	1254	0.08 (U)	0.38	0.66	2.6

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	9.8 E-07	2.3E-06	0.07	0.67
Dermal/Inhalation	9.8 E-07	2.3E-06	0.07	0.67
Exterior				
Ingestion	2.8 E-07	6.5E-07	0.02	0.19
Dermal/Inhalation	2.8 E-07	6.5E-07	0.02	0.19
Total	2.5 E-06	5.9 E-06	0.18	1.72
Total Risk Child & Aduh	8.4 E-06		1.9	

Property R1(135 Delmore).

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	0.62 W			0.9 (W)
Exterior	1254	Not Available			Not Available
	1260	Not Available			Not Available
	Combined	Not Available			Not Available

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior				
Ingestion	4.65 E-07	1.08 E-06	0.03	0.32
Dermal/Inhalation	4.65 E-07	1.08 E-06	0.03	0.32
Exterior				
Ingestion				
Dermal/Inhalation				
Total	9.3 E-07	2.16 E-06	0.06	0.64
Total Risk Child & Adult	3.1 E-06		0.7	

Property 401 Hamilton.

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	39			39.0

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior Ingestion	2.01E-05	4.70E-05	1.47	13.7
Dermal/Inhalation	2.01E-05	4.70E-05	1.47	13.7
Exterior Ingestion				
Dermal/Inhalation				
Total	4.02 E-05	9.4 E-05	2.9	27.4
Total Risk Child & Adult	1.3 E-04		30.3	

Summary of Data.

Location	Aroclor	Minimum (mg/kg)	Mean (mg/kg)	95% UCL (mg/kg)	Maximum (mg/kg)
Interior	1254	1.6			1.6

Summary of Cancer and Non-Cancer Risks

	Cancer		Non-Cancer	
Location	Adult	Child	Adult	Child
Interior Ingestion	8.27E-07	1.93 E-06	0.06	0.56
Dermal/Inhalation	8.27E-07	1.93 E-06	0.06	0.56
Exterior Ingestion				
Dermal/Inhalation				
Total	1.65 E-06	3.86 E-06	0.12	1.12
Total Risk Child & Aduh	5.5 E-06		1.2	

V. Risk Characterization and Uncertainties

Non-cancer hazard quotients of 1 were exceeded for properties FF (1.8), 135 Spencer (1.9), and 401 Hamilton (30).

The non-cancer hazards at 403 A Hamilton (1.2) slightly exceeded the Hazard Index of 1 but is not significantly different from an HI of 1.

The cancer risk slightly exceeded $1 \text{ E-}04$ at 401 Hamilton.

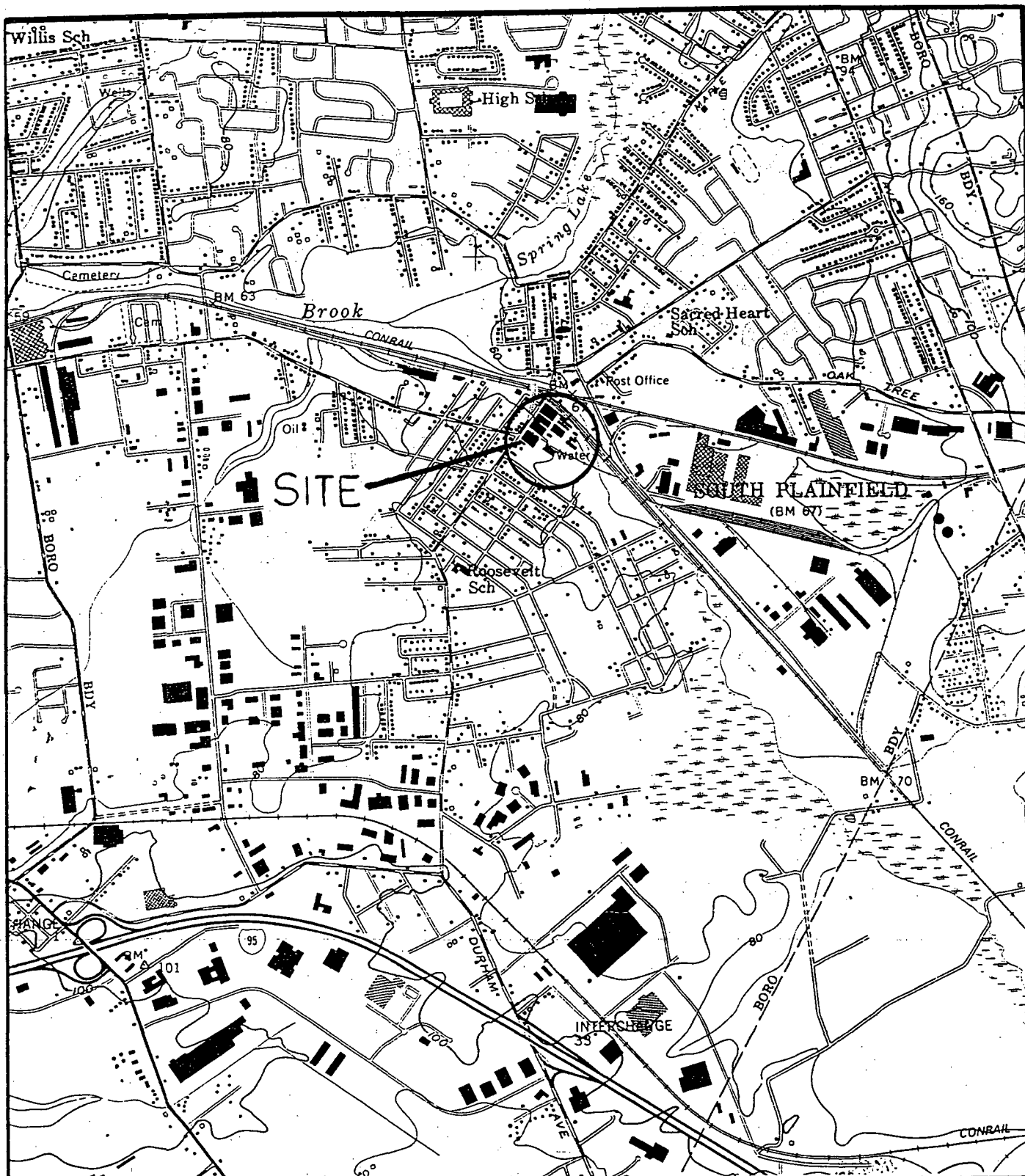
- Several interior samples had extremely low yields resulting in a high detection limit (e.g., 401 Hamilton where the MDL was 38 mg/kg and the concentration found was 38 mg/kg. This would result in a limited amount of material for available for exposure, especially when a chronic exposure is anticipated.
- The risk assessment is a screening level assessment.
- The data is limited to a single sampling event for each area and there is a potential for variability of the concentrations over time. The concentrations used for the interior areas were maximum concentrations for total PCBs including Aroclor 1254 and Aroclor 1260 where Aroclor 1260 was detected. For the exterior areas the concentrations used were the 95% Upper Confidence Limit on the Mean. In those cases where the maximum concentration was exceeded in the calculation of the 95% Upper Confidence Limit the maximum concentration was used.. Depending on the source these concentrations may vary over the assumed exposure duration of 30 years and the calculated risks and hazards may potentially be overestimated.
- The number of interior samples is limited and may result in a potential overestimate of risk since the maximum concentration is used in calculations when a minimum of 10 samples are not available for the analysis of the exposure concentration.
- The sampling report indicates that several of the interior samples had low mass. This would result in a limited amount of material available for exposure. Therefore, the risk may be overestimated based on the chronic exposure assumptions used.
- The assessment includes a number of assumptions concerning the transfer of soil from the exterior to the interior of the homes. These assumptions are based on best professional judgement and may either over or underestimate the risks.

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APPENDIX C

SITE MAPS



WESTON
MANAGERS DESIGNERS/CONSULTANTS

Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH RESOURCE APPLICATION, Inc.
C.C. JOHNSON & MALHOTRA, P.C., R.E. SARRIERA ASSOCIATES,
PRC ENVIRONMENTAL MANAGEMENT, AND GRB ENVIRONMENTAL SERVICES, INC.

EPATM

E. WILSON

START PM

M. MAHNKOPF

CORNELL-DUBILIER
ELECTRONICS
S. PLAINFIELD, NJ

FIGURE 1
SITE LOCATION
MAP

